APRIL 1956 · 15c

The Johns Hopkins Magazine

• THE GREAT GAME OF LA CROSSE

Young Miss Maass bet her life

EVEN at 6:00 A.M., it is warm in Havana. But young Miss Clara Louise Maass felt chilly. Her head ached. Worse, she knew nothing would help.

The illness starts like any other febrile attack. But soon the face is flushed. There is high fever. After two or three days, the pulse becomes feeble, the skin cold and of a lemon-yellow tint. Chances of recovery hardly approximate 50%.

In seven pain-wracked days, yellow fever killed Clara Louise. And it was her own doing.

At Las Animas Hospital, Cuba, in 1901, volunteers were needed for the famous U. S. Army yellow fever experiments.

And she, who had fearlessly nursed the worst fever cases, thought undergoing the disease herself would make her a better nurse. She asked to be bitten by an infected mosquito. "I tried to dissuade her," said the medical director. "But she insisted."

So, in what would soon be America's victorious battle against yellow fever, Clara Louise Maass bravely died as she had lived —for others.

Yet the steel of her quiet, devoted courage still gleams in the strength of today's Americans. For it is still American courage and character that make our country secure— and that actually back our nation's Savings Bonds.

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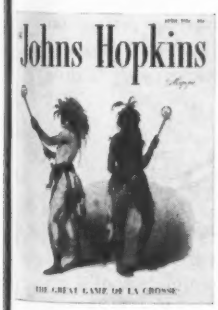

The Cover

Minus war-paint and feathers, but otherwise equally ferocious, lacrosse players are taking to the lists this month. The Indian brand of the game included massacring the spectators on at least one occasion; happily, this feature of the sport is rarely encountered nowadays, even though the players, at times, must be sorely tempted.
DRAWING: BETTMANN ARCHIVE

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The Indians played it, and perhaps Icelanders played it before them. The game that will thrill thousands of spectators starting this month has one of the most colorful histories in sport.

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In increasing numbers since India became independent, her students are selecting the United States as the country in which to pursue university work. Here is one such student's story.

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PAUL J. EISEL
1015 N. Charles
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OLD AND SCHOLARLY
BOOKS
Bought and Sold

EDITOR'S NOTES
AN INFORMAL REPORT

If ever we needed proof of the force of the elements' wrath, we have had it today. An angry windstorm, with gusts that packed a hurricane's force, has wrought destruction around us. Trees that have stood for decades outside the windows of this office, growing tall, casting deep shadows, first groaned, then crackled, then heaved their roots from the ground and fell. The woods nearby are strewn with massive tree-trunks. Two of them have crashed into the end of our building, tumbling wood and glass, bending steel, crushing hedges, blocking roads. None of the hurricanes that have passed this way has done such damage as this winter windstorm, choosing a narrow path for the march of its greatest fury, did in little more than a quarter-hour.

Eugene W. Gudger was the sharpest critic this magazine has ever had. As a charter member of our editorial committee, he made it his business from the start to tell us, in unmistakable terms, exactly what he thought of our output each month. In recent years his sight failed him, but he continued to write to us faithfully. Sometimes it was difficult to read his handwriting (he was eighty-nine when he died in North Carolina in February), but when we did, we found that our critic was still giving his opinions to us straight.

By being outspokenly honest, he both paid us a great compliment and did us a great service. He did so because he was one of the University's most devoted alumni, and he would accept no lesser ideal for Johns Hopkins than the very highest. He loved the University and what it stands for. It was a central factor in his life. He was not a wealthy man (he was a scholar, an internationally known student of fishes), but he gave his savings to the University to establish a fellowship in zoology, his field.

We will miss him.

Our request in this space two months ago for an expression of readers' opinions about our new logotype, the design of our magazine name that appears on our front cover, renewed the flow of letters that, without any prodding from us, had greeted the change when we originally put it into effect. Still no clear-cut verdict, however, even though we received some pretty learned critiques on the subject. Hung jury—so, following the usual procedure in such cases, we'll give the defendant a new trial.

Like all red-blooded American boys, we get the energy to do our job by eating breakfast cereal. Wonderful thing, breakfast cereal, and if you doubt it, just read the labels. An ounce of the crunchy stuff, they will inform you in a handy little short-course in nutrition, provides all sorts of helpful things: fifteen per cent of one's minimum daily requirement of B_1, two per cent of one's M.D.R. of riboflavin, and so on. With one tasty bowlful, you're all set to meet whatever challenges the day may bring.

But more important than energy, even, is the literary inspiration that a box of cereal holds. Were it not for breakfast-cereal boxes, we don't know *where* we'd be today. Without them, it would take us an hour or two to warm up our thoughts, every morning; as it is, after perusing the reading matter on cereal containers while we absently ingest our riboflavin, we're ready to dive right in

But our pleasant little library of cereal boxes—formerly a place where one could calmly pause in comtemplation of one's thoughts—is fast becoming a battle-ground. We became aware of this when, taking advantage of a bargain offer at the local A. & P., we bought two boxes of an old standby called Wheat Chex. Wheat Chex have long been a favorite of ours and of our kids (who think their name is "Wood Chucks"), but we're wondering whether we shouldn't give them up. All is not quiet on the Wheat Chex front.

The first box of Wheat Chex was in the old tradition: three (count 'em, three) exciting premium offers, couched in the prose we have grown to love so well.

On a side panel: "HEY KIDS! Be first to get a Man-from-Mars TOTEM HEAD! . . . Hide behind MAGIC FOREHEAD VISION. You can see out . . . nobody can see in. Confuse your friends with one face in front, one in back. [That would never confuse *our* friends. They're used to anything.] . . ." Twenty-five cents and a box-top.

On the other side: "SMOKIN' ROCKETS! Here's your official OUTER SPACE HELMET. Mystic stato-viewer: You can see out . . . but NOBODY can see IN! Keeps your identity SECRET! You can SPY on Earth-people! Oxygen tubes printed right on the helmet; they look just like the ones rocket pilots need to breathe in the atmosphere of outer space! SOLAR GOLDEN COLOR . . . bright as a flash of light from the sun!" Twenty-five cents and a box-top.

On the back panel: "Wow! KIDS! Look what you can do with your SPACE PATROL PERISCOPE. Big! Twenty-four inches long. Tapered design for wide-angle vision. Has two genuine mirrors for seeing in different directions . . . Has special chart to identify people from other planets."

The box suggests some uses:

"Watch parades . . . see over crowds! Look around corners! See without being seen! Spy on other kids!" And, in another place, as an afterthought, comes an anticlimax: "LOOK OVER FENCES!" Twenty-five cents and a box-top.

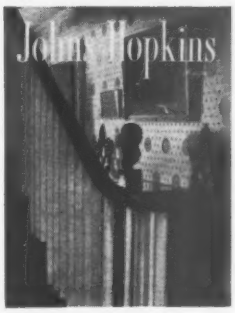
All, on this carton, was right with the cereal-box world.

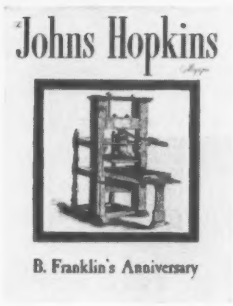
But on the second box, same cereal, it said:

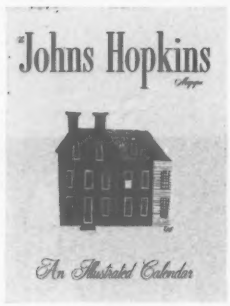
"LOOK, MA, NO PREMIUMS. [And look, Ma, no exclamation points.] In this box you'll find no trading cards, space ships, fission guns. Nothing that rips, roars, or rolls, goes sh-boom or even ptttt . . . No Venetian poison rings, slave bracelets, car jacks, or pictures of Yosemite . . .

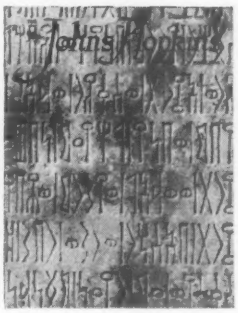
"If you want gadgets instead of gastronomics, your local Five and Ten will gladly help you. We take pride in bringing you the yummiest ready-to-eat cereal you can buy. Why should you be bribed to eat it?"

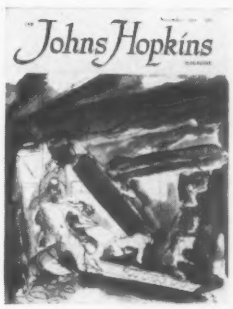
What a startling change in tactics! Unrest in the Wheat Chex ranks?

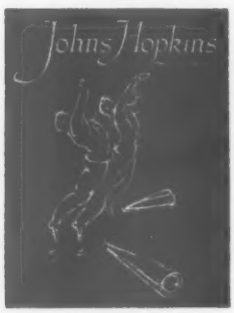


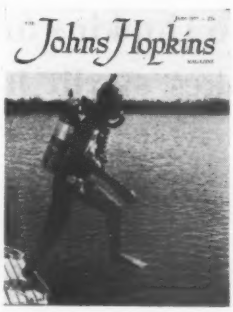


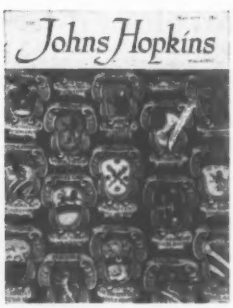












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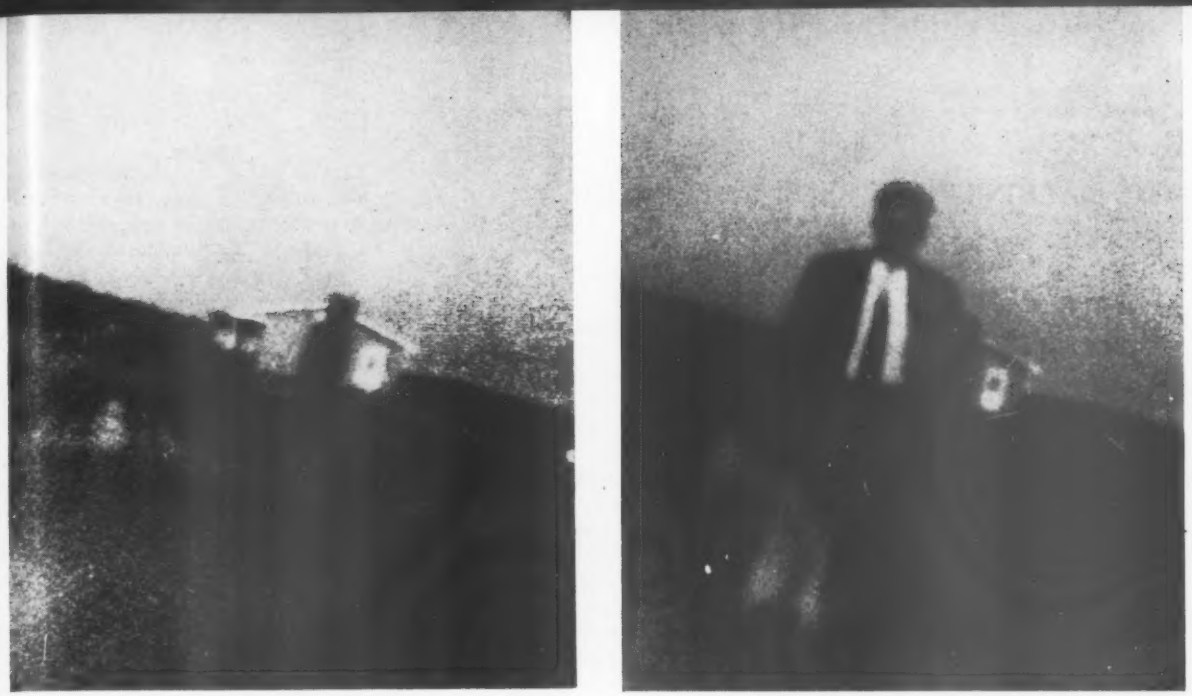
THE MACHINE THAT 'SEES' IN THE DARK

The Lumicon, developed by two Hopkins men, sees Mars as it has not been seen before and makes starlit landscapes seem bright

The girl on the television screen at the right is sitting in a room that is totally dark except for the glow from the tip of her cigarette. The human eye could not discern her features. But the Lumicon, invented by Russell H. Morgan, professor of radiology at Johns Hopkins, and Ralph E. Sturm, physicist (*at top*), has intensified the dim glow so that she appears as if she were spotlighted.

By GWINN OWENS



COURTESY RUSSELL H. MORGAN

On a moonless night, in a field far from the glow of the nearest city, Lumicon first proved itself. There was no light except that from the stars. The human eye, unaided, could not see the house in the picture at the left, and the man was only a dark shape where his head and shoulders blotted out a few stars. These photos were made from the face of the Lumicon's picture tube. It was a rough test, but it brought exciting results.

MAN has always been impatient with his own limitations. Weighted to the earth by gravity, he has envied the birds who soar in graceful flight. Interrupted in his labors by the darkness that envelopes half of all the days of his life, he has long wished that his eyes might penetrate the night and see. His yearnings have been intense, and if wishes were horses . . .

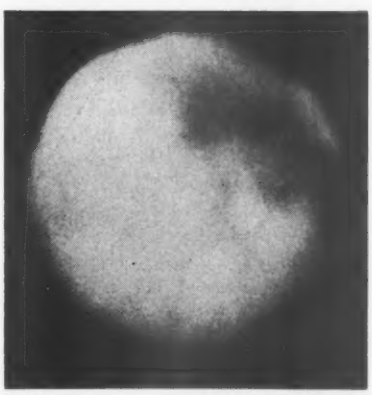
But Evolution has been indifferent to them. Man has not yet sprouted wings, nor has he grown eyes that can see by the light of the stars. Yet, in his own way, man has surmounted his handicaps. He can—with a ticket, a limousine to the airport, an airplane, and a supply of combustible fluid—fly; and even with its encumbrances, flight is one of his happiest achievements. And now, through his own inventiveness, man can see by the stars.

Two Johns Hopkins scientists have brought forth the means. Like flight, it involves expensive encumbrances. But it is a reality, nevertheless.

THE new invention is the product of Russell H. Morgan, professor of radiology at Johns Hopkins, and Ralph E. Sturm, a research physicist. It is called the "Lumicon," a name provided by the Bendix Aviation Corporation, whose Friez Instrument Division near Baltimore has taken over the commercial manufacture of the device.

The Lumicon is, essentially, a closed television circuit, with a camera at one end and a picture tube at the other. Between them is an intensifier that takes the light picked up by the camera and makes it appear on the picture tube with its brightness increased up to fifty thousand times.

The Lumicon will not work in complete darkness, but it efficiently utilizes minute quantities of light. An object placed before the camera on a moonless night, with only the light from the stars available, will show on the picture tube almost as clearly as if it were being televised in broad daylight.



LOWELL OBSERVATORY

As Lumicon saw Mars

Since its basic job is intensifying light, the Lumicon can be used wherever such intensification is necessary: in x-ray, to brighten the image on the screen of a fluoroscope; in astronomy, to brighten the image of heavenly bodies seen through a telescope. The United States government, which has financially supported Lumicon research, has not revealed any military uses, but it is easy to imagine some possibilities: what a device that sees in the dark could do for ships, planes, or vehicles that must maneuver without lights, or in probing and photographing enemy territory at night.

At Johns Hopkins, the Lumicon is already being used routinely in connection with some forms of fluoroscopy and x-ray therapy. It is probably not an exaggeration to say that it is revolutionizing the techniques in this field.

For astronomy or, more specifically, astronomical photography, "it will be

THE MACHINE THAT 'SEES' IN THE DARK

Continued

as revolutionary a tool as was the discovery of the photographic process," according to Albert G. Wilson, director of the Lowell Observatory at Flagstaff, Arizona. He speaks from direct experience. Even under relatively poor and haphazard conditions, the Lumicon, affixed to a telescope at Flagstaff, has produced some of the most remarkable pictures of the planet Mars ever taken.

The germ of the Lumicon idea seems to have formed in Dr. Morgan's mind when he was a resident in pathology before World War II in St. Luke's Hospital in Chicago. He was disturbed about the inadequacy of the dim image on the screen used in x-ray fluoroscopy. Later, when he became a radiologist, he was in a better position to do something about it.

The fluoroscope is composed of an x-ray machine and a screen coated with a material that glows when x-rays strike it. The patient stands (or lies) between the x-ray machine and the screen. The rays that pass through him show up on the screen; those that encounter denser areas, such as bones, do not pass through, and hence leave dark areas on the screen. The result is a sort of shadow-picture of the patient's anatomy.

Because the image is so dim, the fluoroscope has always been less than satisfactory, but radiologists have had to make the best of it. True, the radiation from the x-ray machine could be made stronger so as to brighten the picture, but it would then be strong enough to damage the patient's tissues, not to mention the radiologist himself. The radiologist has had to accept the less-than-ideal image, and part of his preparation for examining a patient has been to spend a wasteful fifteen to thirty minutes adapting his eyes to darkness. And even with the level of radiation generally used, there is a limit to the time that a patient can safely be exposed to it.

This is the problem that Dr. Morgan —and doubtless many other radiologists—worried about. After leaving St. Luke's Hospital, he became a resident in radiology and then a radiologist at the University of Chicago. He took his present post at Johns Hopkins in 1946.

It was the combination of Dr. Morgan and a well-trained physicist, Mr. Sturm, that produced the Lumicon. Dr. Morgan had had no formal training in electronics, but he has a tremendous enthusiasm for the physical sciences and has acquired considerable knowledge in the field. Mr. Sturm had been section chief for electronics at Bendix-Friez from 1945 to 1948, leaving to continue graduate work at Johns Hopkins. When be became acquainted with Dr. Morgan, they decided to attack the problem of an electronic light intensifier together.

By 1950 they had produced their first model. While it was later to be refined, it worked well in principle. Affixing the camera to the fluoroscope and utilizing light-gathering lenses to get maximum efficiency, the intensifier produced the brightest fluoroscopic pictures ever seen. In December, 1950, a dramatic experiment was tried. On a network television program, the Johns Hopkins Science Review, the image of a diseased organ was televised—and doctors in three cities were able to hold a diagnostic consultation on the basis of what they saw.

Russell H. Morgan

As an aid to fluoroscopy, the new invention proved a boon in many ways. First, it made possible the use of much lower x-ray intensities, because an image scarcely visible at all on the fluoroscopic screen could be detected by the intensifier. This meant the patient could be exposed longer without danger from radiation. It meant the television camera was placed where the doctor's eyes formerly had to be, and the doctor, with his picture tube, could be in the next room, if he wished, far from the effects of the radiation.

As Dr. Morgan and Mr. Sturm refined their intensifier, new medical uses were found for it and one success followed another. In December, 1951, Dr. Morgan announced the first motion pictures of the gastro-intestinal tract in action. This had not been possible with conventional fluoroscopes because their images were far too faint for any camera to record. Furthermore, no patient could be exposed long enough to make a movie worthwhile. But with the new combination of a brighter image and lower radiation, it became feasible to film long sequences. These motion pictures—of digestion, heartbeats, or anything that involves motion —have already proved their usefulness in teaching, research, and, in rare instances, diagnosis.

It was also in 1951 that the American Röntgen Ray Society awarded the two Hopkins men its gold medal for singular achievement in radiology.

In 1953 came another triumph of the intensifier—its use in x-ray therapy. This was made possible by combining the fluoroscope with therapeutic x-ray plus the new invention. Ordinarily, when the radiologist has wanted to use x-ray to destroy a deep-seated cancer—of the esophagus, for example—he has had to point the beam more or less blindly at the spot where he thinks the cancer is located. This means there is some risk of damaging the surrounding tissue.

To solve this problem, Dr. Morgan and Mr. Sturm put the patient in the usual position for a diagnostic examina-

Continued on page 18

BETTMANN ARCHIVE

THE GREAT GAME

It started with the Indians—or maybe it was the Icelanders. Today, still bearing a family resemblance to the massacres of old, lacrosse is whooping it up on many a spring afternoon

On June 4, 1763, the British garrison at Fort Michilimackinac, on the south shore of the strait that connects Lake Huron with Lake Michigan, had been given the day off, in celebration of the birthday of King George III. The wilderness settlement, whose name the British usually shortened to "Mackinac," was in festive spirits.

The Ojibway and Sac Indians, encamped near the fort, had invited the troops to a game of *baggattaway*, to be played in honor of the king. The gate of the garrison swung open, and the soldiers collected in groups in the shadows of the palisades to watch. A number of French Canadians mingled with them. A "multitude of Indian squaws," reported Francis Parkman, "wrapped in blankets, were conspicuous in the crowd."

Baggattaway was a well-known Indian sport, well worth watching. A trapper named Alexander Henry, who was present at Michilimackinac, recounts that at both ends of a field tall posts had been driven into the ground as goals. "Hundreds of lithe and agile figures were leaping and bounding upon the plain," he wrote, in an effort to defend their own goals and drive the ball toward their opponents'. In their excitement the Indians cried and shouted. "Rushing and striking, tripping their adversaries or hurling them to the ground, they pursued the contest amid the laughter and applause of the spectators," Henry said.

Suddenly, from the midst of the horde of players, the ball soared into the air and fell among the onlookers. "As if in pursuit of the ball," Parkman wrote that Henry (who, if nothing else, was a graphic reporter) said afterward, "the players turned and came rushing, a maddened and tumultuous throng, towards the gate. In a moment they had reached it. The amazed English had no time to think or act. The shrill cries of the ball players were changed to the ferocious war-whoop. The warriors snatched from the squaws the hatchets which the latter, with this design, had concealed beneath their blankets. Some of the Indians assailed the spectators without, while others rushed into the fort, and all was carnage and confusion . . ."

Henry managed to find refuge in the house of a French Canadian (the French settlers were left unmolested) and lived to describe how "the dead were scalped and mangled; the dying were writhing

THE GREAT GAME OF LACROSSE

Continued

and shrieking under the unsatiated knife and tomahawk; and from the bodies of some, ripped open, their butchers were drinking the blood, scooped up in the hollow of joined hands . . ."

From such beginnings it could hardly have been predicted that *la crosse*, the French name for the Indian game, would become Canada's national sport, that it would spread to England, Ireland, and the United States, that it would be played in the modern Olympic games, or that it would be widely played by women. But it has.

Lacrosse has one of the longest and most colorful genealogies in American history. The letters of the early French explorers, missionaries, and settlers are full of notes about the Indian game of *baggattaway*. And there has even been some talk of the Vikings' bringing the game to America as early as the tenth century, a theory supported by the numerous references in medieval Icelandic prose to a ball game that was similar in its wild spirit to lacrosse. But these references, in Egil's Saga, Gisli's Saga, and Gretti's Saga, do not clearly record any rules, nor do they give details of how the game was played.

However lacrosse first got to North America, it was played by the Indians from one end of the continent to the other. The Algonquins called it *teiontsesiksaheks*, the Iroquois *tehontshiksahelks*, the Ojibways and many other tribes *baggattaway*. The Jesuit Pierre François Xavier de Charlevoix was searching for a new route along the St. Lawrence River in 1719 when he saw some Algonquins playing the game. He likened the sticks they used to the crosiers, resembling the crooks carried by shepherds, that bishops carry as symbols of pastoral office. It was probably from Charlevoix' description of the Indians' racquets that the term *la crosse* came to be applied to the game in general.

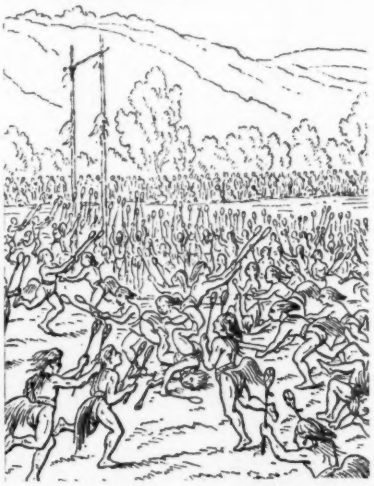
The Indian game was no hastily improvised, sandlot affair. As many as six hundred or a thousand braves would play in one contest, the size of the teams depending on the number of men available in a tribe. The fields were from five hundred yards to a mile long, with no out-of-bounds marks.

The major-league encounters were the inter-tribal matches. They were arranged three or four months in advance. By the appointed date fifteen or twenty thousand people might be camped around the site. The day before the game the goals were marked off with great ceremony, each usually consisting of two poles six to ten feet apart and twenty-five feet high.

While the men prepared for the game, the women took bets, an operation in which they placed everything, from dresses to horses to guns, on a line. When everything was ready the teams repaired to their camps for an all-night session of pre-game dancing, chanting, and prayer.

Early the next morning the teams appeared on the field with their sticks. (Some tribes used two small sticks per man rather than the one large-pocketed racquet.) The rules forbade any man's wearing moccasins or any dress other than a breech-cloth and a decorative bead belt, a horsehair mane and tail. All weapons were left in the encampments, and no one was permitted to go back for one.

The play itself had no rules to hold down the fun. Each man tried to catch the ball in his stick and send it through his opponents' goal. Action was continuous from dawn to dusk, with only a one-minute intermission after each goal. Should a player tire and slow down, the squaws on the sidelines switched him with twigs. Fights between individual players were common, and it was considered bad form to interfere in them.



BETTMANN ARCHIVE

The game was usually played until one team scored a predetermined number of goals, frequently as many as one hundred. George Catlin, a Philadelphia lawyer who gave up the law to paint portraits and, later, to travel west and study and paint the Indians, reported that when the contest finally ended, "by previous agreement [they] produced a number of jugs of whisky, which gave all a wholesome drink and sent them all off merry and in good humor, but not drunk."

Catlin, who spent years studying the customs of the North American Indian, "made it a uniform rule, whilst in the Indian country, to attend every ball play I could hear of, if I could do it by riding a distance of twenty or thirty miles." He considered the scenes presented by a game of *baggattaway* "a school for the painter or sculptor, equal to any of those that ever inspired the hand of the artist in the Olympian games or the Roman Forum."

The white man, despite his occasionally being massacred in the course of it, was fascinated by the game. As early as 1740 some French pioneers, evidently a trusting and a foolhardy lot, are said to have met the Indians at their own game. The occasion must have been a monumental fiasco from the settlers' point of view. It took another hundred years for white men to work up any enthusiasm for playing it, and even then it was the general opinion that no group of whites could match a good Indian team.

The missionary zeal of a Montreal physician, W. G. Beers, finally established lacrosse as an organized sport, and it won him the title of "father of modern lacrosse." Beers was active in forming the Montreal Lacrosse Club in 1849 and in spreading the game through the provinces. In 1861 the Prince of Wales, later King Edward VII, made a much-publicized tour of Canada. Beers arranged a lacrosse game between the Montreal and Beaver Clubs and the Caughnawaga and St. Regis Indians. The game was spectacular

BETTMANN ARCHIVE

On the King's birthday, 1763, lacrosse leads to a massacre of Englishmen at Fort Mackinac.

and the prince lavishly praised the sport.

By the time the Dominion of Canada was formed in 1867, the game was popular enough to be made the national sport. Beers, who had just drawn up the first set of written rules and formed the National Lacrosse Association of Canada, immediately set off for Europe with two Indian teams. They played exhibitions in England, Ireland, and France. The next year, 1868, he went back to England with an Indian team and a white team. By the time they returned to Canada, teams had been organized in Glasgow and London.

Despite Canada's early rôle in spreading lacrosse, it is not as widely played there now as it was before the first World War. The decline in popularity was largely caused by the effects of professionalism, coupled with the attraction of other leisure-time activities. Canadian lacrosse rivalry had become so high-pitched that as a matter of civic pride every community tried to import good players to strengthen its team. The ringers got soft jobs at high pay, and the cost of maintaining a team became more and more burdensome. Soon the small towns dropped the virtually commercial sport, and it was only a matter of time before lacrosse collapsed in the larger centers for want of new talent from the bush leagues. Currently the game is kept from extinction by university and a few club teams. Indoor or box lacrosse flourishes in many sections, but it resembles field lacrosse approximately as much as Ping-pong resembles *jai-alai*.

THE game was first taken up in the United States by clubs in the Midwest, North, and East; the Mohawk Club of Troy, New York, seems to have been the earliest. At the fifth annual convention of the United States National Amateur Lacrosse Association in 1883, it was decided that there were enough teams in the Middle West to form a separate western association. The rabid interest first accorded to lacrosse in towns like Chicago, Louisville, and Atlanta soon died out, but it gained a strong hold on New York, Boston and Philadelphia.

A track and field team composed of the scions of Baltimore's leading families went, in August, 1878, to compete in a three-day sports carnival at the Westchester Polo Club in Newport, Rhode Island. While there they got their first look at lacrosse and liked it so well

Continued on page 20

By GRAYSON KIRK

UNIVERSITIES AND

The end objective of education, even at the postgraduate

EIGHTY years ago Daniel Coit Gilman gave his inaugural address as the first president of this University. Such an anniversary should not be allowed to pass unnoticed because it was an event of the first importance in the history of American higher education. The opening of this institution ushered in a new era, a new dimension in education. Under President Gilman's wise guidance, Johns Hopkins brought to America its first genuine university. Though other colleges had earlier added postgraduate courses and professional schools, they lacked for the most part the clear concept of what a true university ought to be. It was Gilman who pointed the way and it was Hopkins which demonstrated its validity. The debt of all America to them can best be realized if we contemplate the flowering of their ideal through these eight decades. The results have been so striking that even President Gilman with all his vision could scarcely have anticipated the impact of this institution upon the nation and the world.

The word "vision" was not used rhetorically with respect to Johns Hopkins' first president. He foresaw with amazing clarity many of the problems which his successors of lesser stature in sister institutions periodically rediscover for themselves. His warning against the evils of premature specialization could have been—and frequently is—written today. His insistence that best results will be achieved by combining teaching and research in the program of each scholar is even more timely now than in 1876. So, too, is his admonition that universities should limit the academic fields which they endeavor to cover. Most of our institutions today try to do far too much. They seem to feel that unless they offer everything that is offered everywhere else, they will suffer in prestige. They fail to realize, as President Gilman knew, that reputation and standing depend on depth even more than breadth.

While we are recalling these views which made President Gilman great, let us not forget his repeated insistence that the end objective of education, even at the postgraduate level, is not so much technical proficiency as character. In these days when the demands of specialized knowledge upon the student grow ever greater until they reach frightening proportions, the sane counsels and the calm sense of perspective of President Gilman are refreshing. Moral integrity is still our most important product, and if we, or our students, are ever allowed to forget it, our society will have been dealt a mortal blow.

One view remains to be mentioned: the responsibility of the university in preparing men for public life. As Dr. Gilman observed in his inaugural address, "there is a call for men who have been trained by other agencies than the caucus for the discussion of public affairs; men who know what the experience of the world has been in the development of institutions, and are prepared by intellectual and moral discipline to advance the public interests, irrespective of party, and indif-

PUBLIC SERVICE

level, is not so much technical proficiency as character

The author, Grayson Kirk (*right*), has been the president of Columbia University since 1953. A distinguished educator and specialist in the field of international affairs, he began his career at Columbia as associate professor of government and twelve years later became its chief executive officer. This article is an adaptation of Dr. Kirk's address at the eightieth Commemoration Day exercises of the Johns Hopkins University earlier this year. The exercises were dedicated to Woodrow Wilson, the twenty-eighth President of the United States, who received his Ph.D. in political science here in 1886.

ferent to the attainment of official stations."

This was a calm judgment upon one cherished belief in the historic folklore of American politics. During the half century since Andrew Jackson had first conquered the citadel of Washington, the prevailing attitude had been that public office could be safely held by the ordinary man, and without special training. Indeed, it was widely believed that democratic society was safer in the hands of the ordinary, rather than the extraordinary, man. But the Grant administration had shaken many men loose from this conviction, and the then-current movement for Civil Service reform carried with it a demand that more educated men be channeled into public life.

Such was the temper of the times, and this University responded by affirming the conviction that one of its responsibilities was to teach those subjects which would prepare men for a career in the public service. As President Gilman said, "... I refer to the principles of good government, including jurisprudence on the one hand and political economy on the other. Legislation, taxation, finance, crime, pauperism, municipal government, morality in public and private affairs, are among the special topics. The civil law, international law, the early history of institutions, in short, the history of civilization and the requirements of a modern state, come under this department."

THE thin young Virginian who took his doctorate at Johns Hopkins just seventy years ago, a decade after Gilman's forecast, needed no special argument on this point. From his rich days at Hopkins until the end of his life, Woodrow Wilson believed passionately that universities had a spe-

Continued on page 22

In a snowstorm, Usha Mahajani of Delhi hurries to a class.

STUDENT FROM INDIA

She is one of many who have come to the United States to study in growing numbers since their country achieved its independence

SINCE attaining independence, more and more young people of India have been coming to the United States to study. Usha Mahajani, who is pictured on these pages and the two following, is one of them. She has been away from home for more than three years: two at Smith, where she earned her M.A., a year and a half at Johns Hopkins, where she is working toward her PH.D. Her field is Southeast Asia. After Hopkins, she hopes to do some traveling and studying there.

Photographs for The Johns Hopkins Magazine by ROBERT MOTTAR, Scope

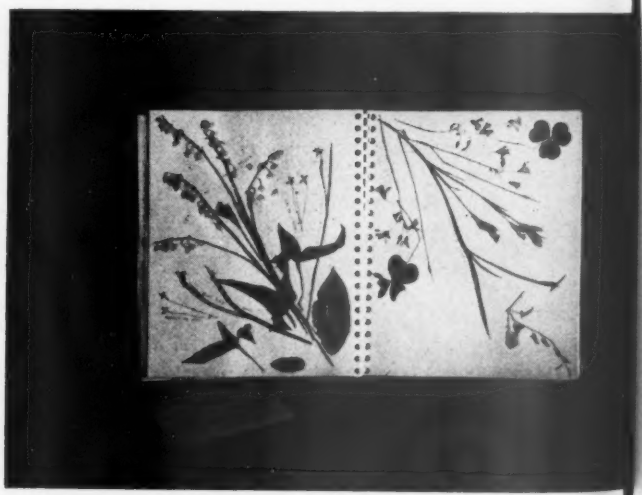
STUDENT FROM INDIA

Continued

In a course dealing with the rôle of ancient China in history, Usha Mahajani meets with Owen Lattimore before a map of Asia. Last year she often spoke to civic groups, but this year her studies have taken up nearly all of her time.

In the stacks of the Hopkins library, Miss Mahajani talks with a teacher from Calcutta University who is at Johns Hopkins on a Rockefeller grant. Miss Mahajani has a desk in the stacks but does most of her studying at home.

At lunch, she joins other graduate students in cafeteria. She cooks her own evening meal—but "cooks" isn't quite the right word, she says, since she has little interest in cooking and usually ends up simply boiling some vegetables.



One day near the campus, she found a yellow jasmine blossom, and thus began a hobby: collecting and pressing the flowers that she finds on her walks. Many of them are not found in India; they will remind her of America, she says

Most afternoons, Usha Mahajani has tea with Mrs. Helen Stockton Parker, with whom she lives. ➤

A Johns Hopkins Gazette

AN UNOFFICIAL COMPENDIUM OF FACULTY AND ALUMNI APPOINTMENTS, HONORS, AND ACCOMPLISHMENTS

BOOKS

Herbert Busemann, Fac. '39–'40 (Mathematics): *The Geometry of Geodesics* (Academic, $9).

Ethel C. Dunham, M.D. '18, House Staff '18–'19 (Pediatrics): *Premature Infants* (Hoeber Harper, $8).

Halbert Louis Dunn, Fac. '25–'29 (Biometrics), supervisor: *Vital Statistics of the United States*; Vol. II, *Mortality Data* (Government Printing Office, $4).

George E. Farrar, Jr., M.D. '31, and Arthur Osol: *The Dispensatory of the United States of America* (Lippincott, $25).

Lytt I. Gardner, Fac. '50–'52 (Pediatrics): *Adrenal Function In Infants and Children* (Grune and Stratton, $7).

Jean Gottmann, Fac. '43–'48 (Geography): *Virginia at Mid-Century* (Holt, $7.50).

Robert Frederick Loeb, House Staff '20–'21 (Medicine), and Russell Cecil: *Textbook of Medicine*, ninth edition (Saunders, $15).

Robert M. MacIver, Fac. '34–'35 (Political Science); *Academic Freedom in Our Time* (Columbia, $4).

Gustavo Molina-Guzman, M.P.H. '42, and Guillermo Adriasola: *Principios de Administracion Sanitaria* (University of Chile).

Pat Ireland Nixon, M.D. '09: *A History of the Texas Medical Association, 1853–1953* (University of Texas, $6).

Charles William Rees, Fellow '26–'28 (Hygiene): *Problems in Amoebiasis* (Thomas).

Arthur E. Ruark, B.A. '21, M.A. '23, PH.D. '24, Fac. '46–'52 (Physics), O. H. Blackwood, and T. H. Osgood: *An Outline of Atomic Physics* (Wiley, $7.50).

James B. Scarborough, PH.D. '23 (Mathematics): *Numerical Mathematical Analysis* (Johns Hopkins).

Frank Gill Slaughter, M.D. '30: *The Scarlet Cord* (Doubleday).

George S. Stevenson, M.D. '19, House Staff '19–'20 (Psychiatry): *Administrative Medicine* (Josiah Macy, Jr. Foundation, $3).

Rosabelle Price Walkley, research associate in biostatistics, Daniel Wilner, and Stuart Cook: *Human Relations in Interracial Housing* (Minnesota, $4).

THE FACULTY

Walter F. Perkins, president of the board of trustees of the Hospital, has announced the election of William Preston Lane, Jr., Herbert J. Watt, and Charles S. Garland to membership on the board. Mr. Lane was governor of Maryland from 1947 to 1951, Mr. Watt is president of the Canton Company, and Mr. Garland is a partner in the investment banking firm of Alexander Brown and Sons.

Kemp Malone, Caroline Donovan professor of English, has been elected president of the American Name Society for the current year.

AT THE SCHOOL OF MEDICINE, Leo Kanner, associate professor of psychiatry and pediatrics, has been designated Knapp Distinguished Professor by the School of Medicine at the University of Wisconsin. Dr. Kanner will serve as visiting professor of psychiatry during the second semester of the current academic year.

Alfred Blalock, professor of surgery, has been elected a foreign associate in the Academy of Sciences of the Institute of France. Only eleven foreign associates may be members of the Academy at any time. Dr. Blalock takes the place of the late Sir Alexander Fleming, British discoverer of penicillin.

Donald W. Benson, currently assistant professor of anesthesiology at the University of Chicago, has been appointed associate professor and anesthesiologist in charge at the School of Medicine and Hospital.

Mark M. Ravitch, M.D. '34, House Staff '34–'46 (Surgery and Pediatrics), Hunterian Teaching Fellow '36–'37, Halsted Fellow '37–'38, Fac. '36–'52 (Surgery), has been appointed surgeon in chief of the Baltimore City Hospitals. He has also resumed his appointment at Hopkins as associate professor of surgery.

AT THE SCHOOL OF HYGIENE AND PUBLIC HEALTH, Howard A. Howe, adjunct professor of epidemiology, has been awarded the 1955 "Unsung Hero" award given in Baltimore to encourage youth by adult example. Dr. Howe was cited for "patience, persistent faith, and pioneering contributions in mankind's fight against polio."

THE ALUMNI

Avra M. Warren, B.A. '15, has retired as United States Ambassador to Turkey and from the Foreign Service. During thirty-five years in the Foreign Service, he rose from consul to Minister or Ambassador to the Dominican Republic, Panama, New Zealand, Pakistan, and Turkey.

Gilbert Chinard, Fac. '19–'36 (French Literature), has been elected president of the Modern Language Association for the current year.

J. Edward Hoffmeister, B.A. '20, PH.D. '23 (Geology), has been elected treasurer of the Geological Society of America.

Harold C. Urey, Fac. '24–'28 (Chemistry), has been elected an honorary fellow of the Indian Academy of Sciences.

Millicent Carey (Mrs. Rustin) McIntosh, PH.D. '26 (English), LITT.D. '55 (Honorary), has been elected a member of the board of trustees of the New York Public Library.

Harold W. Stoke, PH.D. '30 (Political Science), has been elected president of the Association of Graduate Schools of the American Association of Universities.

Jonathan E. Rhoads, M.D. '32, professor of surgery at the University of Pennsylvania School of Medicine, has been elected provost of the University of Pennsylvania.

Edward W. Russell, Fellow '34–'35 (Chemistry), has been appointed director of the East African Agriculture and Forestry Research Organization in Kenya.

William A. Brumfield, Jr., C.P.H. '35, has become Westchester County, N.Y., commissioner of health.

Robert N. Barr, M.P.H. '36, has been appointed secretary and executive oficer of the Minnesota State Department of Health.

Robert H. Levi, B.S. '36 (Economics), has been elected president of the board of directors of Sinai Hospital in Baltimore.

George Ernest Wright, M.A. '36, PH.D. '37, Fellow '44–'45 (Oriental Seminary), has been appointed archaeological director of the extensive expedition being undertaken by the McCormick Theological Seminary of Chicago. Excavations will be made at the ancient city of Shechem, in what is now Jordan.

Dorland Jones Davis, M.D. '37, DR. P.H. '39, has received the Stitt award from the Association of Military Surgeons. He is a virologist at the National Institutes of Health in Bethesda.

Francis E. Council, DR.P.H. '38, has been appointed Army deputy director of the Armed Forces Institute of Pathology.

Benjamin Phillips, PH.D. '41 (Chemistry), has been appointed assistant director of research in organic chemicals with the Carbide and Carbon Chemicals Company.

Albert E. Heustis, M.P.H. '42, has been awarded an honorary LL.D. by Michigan State University.

Arthur Gorman Hills, M.D. '42, has been appointed associate professor of medicine at the University of Miami Medical School.

Margaret Elizabeth Rice, M.S. '42 (Hygiene), has been elected president of the Mississippi Public Health Association for the current year.

Edwin S. Campbell, B.A. '46, has been appointed assistant professor of chemistry at New York University.

Walter James Kuhl, Jr., M.D. '47, has been appointed assistant professor of medicine at Northwestern University School of Medicine.

Byron L. Steger, M.P.H. '48, DR.P.H. '50 Fac. '47–'49 (Military Science), has been appointed chief of the education and training division of the Office of the Army Surgeon General.

Herbert Gaines Langford, House Staff '50–'52 (Medicine), has been appointed assistant professor of medicine at the University of Mississippi School of Medicine.

Paul J. LaBenz, SC.D. '53, Fac. '53–'55 (Environmental Medicine, Laryngology and Otology), has been appointed assistant professor of audiology at Vanderbilt University School of Medicine.

Alfred Jay Bollet, Fac. '54–'55 (Medicine), has been appointed assistant professor of medicine at Wayne University College of Medicine.

DEATHS

Wilmar M. Allen, M.D. '20, House Staff '22–'24 (Obstetrics); on January 14, 1956. He had been the director of Hartford Hospital and one-time president of the American College of Hospital Administrators.

Charles Edward Balfour, Jr., M.D. '31; on January 19, 1956. He was practicing psychiatry in Baltimore.

Mary Kendrick Benedict, M.D. '19; on February 10, 1956. She was president emeritus of Sweet Briar College, had been dean of women and resident physician at Connecticut College, and until her retirement had practiced medicine in New Haven.

James Howard Brown, associate professor emeritus of bacteriology; on February 9, 1956. He had been a member of the Johns Hopkins faculty since 1923 and was president of the American Society of Bacteriologists in 1931.

Eldridge Campbell, M.D. '27, House Staff '27–'34 (Surgery); on February 15, 1956. He was professor of surgery at Albany Medical College and surgeon in chief at Albany Hospital, and had recently been elected chairman of the American Board of Neurological Surgery.

Cyril N. Carroll, B.S. '37; on February 4, 1956. He was a teacher in the Baltimore public schools.

Joseph Albert Chatard, G. '98–'99 (Biology), M.D. '03, Fac. '05–'23 (Medicine); on January 27, 1956. Active in Baltimore medical and civic affairs, he had been president of the Medical and Chirurgical Faculty of Maryland.

Edward Duffy, B.A. '87; on February 20, 1956. Before his retirement he had practiced law in Baltimore.

Alice W. Elliott-Graham, G. '29–'30 (Zoology); on January 18, 1951. She had been a practicing physician in Corpus Christi, Texas.

Edward M. Finesilver, M.D. '24; on December 18, 1955. He had been a founder-member of the American Board of Plastic Surgery and was chief of surgery at Mount Sinai Hospital in Hartford, Conn.

Harold North Fowler, G. '80–'81 (German); on September 29, 1955. He was professor emeritus of Greek at Western Reserve University College for Women, and consultant to the Library of Congress on classical literature.

Victor Max Frey, B.A. '06; on January 4, 1956. He was a consulting and sales engineer in York, Pennsylvania, at the time of his death.

Albert J. Gminder, Arts '86–'87; on February 6, 1956. He had been an educator in the Baltimore school system.

Charles C. Grove, PH.D. '06 (Mathematics); on January 12, 1956. Before retiring in 1947, he had served for twenty-six years as professor of mathematics at the City College of New York.

Eugene W. Gudger, PH.D. '05 (Zoology); on February 19, 1956. He was an honorary curator emeritus of the American Museum of Natural History. He had edited the museum's index volume of the Bibliography of Fishes and the Bashford Dean Memorial Volume on Fishes, and was an internationally known ichthyologist.

James Hentschel, McCoy '46–'47, '52–'53; on December 7, 1955. He was killed in an aircraft accident.

Albert C. Hobelmann, Jr., B.E. '50; on February 21, 1956. He was an engineer with the Independent Oil Company in Altoona, Pennsylvania.

Marguerite E. Linthicum (Mrs. George H.) Hopkins, B.S. '21, G. '21–'22, '30–'32, '35–'36 (Education); on November 29, 1954. She had been the principal of the Annapolis Elementary School.

Herman Holland de Jong, Fac. '46–'49 (Psychiatry); on February 16, 1956. He was director of research and education at Kansas State Hospital.

John F. Keczmerski, B.S. '33; on January 21, 1956. He was in business in Maryland.

Samuel J. Keiser, B.A. '14; on January 20, 1956. He was the president of a Baltimore insurance firm.

Samuel Shipman Kingsburg, PH.D. '98 (Greek); on August 5, 1953. He had

served for twenty years as professor of Latin and Greek at Carroll College.

Huguette Dubreuil Kreitz, G. '49–'50 (Romance Languages); on January 2, 1956. She was teaching at a college preparatory school at the time of her death.

Kenelm Julius Lee, M.D. '04; on February 18, 1956. He had been a practicing physician in Minneapolis.

Herbert Ross McMahan, Engineering '23–'26; on June 7, 1954. He had been a carpenter in Cambridge, Md.

William Harvey Maddren, G. '96–'97 (Biology), M.D. '01; on October 17, 1955. He had retired and was living in Freeport, N. Y.

Herbert William Magoun, PH.D. '90 (Sanskrit); on January 8, 1956. He had been an educator and writer in the fields of religion, science, and the Orient and was within one month of his hundredth birthday at the time of his death.

John A. Mahar, G. '10–'11 (Romance Languages); on January 10, 1956. He had been, before retirement, professor and chairman of the French department at Albany State Teachers College.

Henry Parker Manning, PH.D. '91 (Mathematics); on January 11, 1956. He had been professor emeritus of mathematics at Brown University since 1930.

Henry C. Miller, B.A. '04; on December 24, 1955. He had been active in the investment and banking business in Baltimore most of his life.

Jessie Rogers (Mrs. Louis) Nash, Graduate Nurse '15; on January 16, 1956.

Paul Lee Norris, B.E. '51; on January 31, 1956. He was a lieutenant in the Air Force and was killed in an aircraft accident.

Thomas Grover Orr, M.D. '10; on November 19, 1955. He was professor emeritus of surgery at the University of Kansas School of Medicine, and had written many articles and books on surgery.

Mary Jane Rosser, Graduate Nurse '05; on February 10, 1956. She had been a private nurse since her graduation and had spent most of her time at Johns Hopkins.

Aaron M. Sakolski, PH.D. '05 (Political Economy); on December 29, 1955. He had been an educator in both New York City and Baltimore.

Bromley Smith, Fellow '22–'23, G. '33–'38 (English); on November 7, 1955. He was engaged in research, particularly on Elizabethan literature.

John R. M. Staum, Arts '95–'96; on February 16, 1956. He had been elected to the Maryland House of Delegates in 1902 and later became one of the first judges of the People's Court in Maryland.

Daniel Delehanty Vincent Stuart, Jr., G. '12–'14, Fac. '17–'21 (Psychology and Neurology); on November 11, 1955. He was a retired physician.

Helen A. Wadland, Graduate Nurse '05; on January 28, 1956.

Mary Cooper (Mrs. Millard C.) Ward, G. '26–'28 (Archaeology); on December 1, 1951. She was the academic head of the Asheville Country Day School at the time of her death.

Palmer W. Ward, McCoy '49–'50; on October 15, 1954. He had been a captain in the counter-intelligence branch of the United States Army.

Harold Randall Webb, M.D. '06; on October 28, 1955. He had been a practicing physician in Brunswick, Maine.

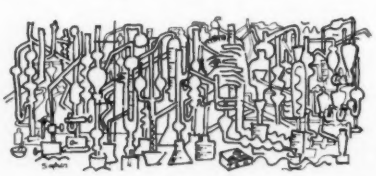
Richard M. Wick, PH.D. '32 (Chemistry); on February 18, 1956. He was a research engineer with the Bethlehem Steel Company in Pennsylvania.

Henry F. Wile, G. '09–'10 (Chemistry); on November 26, 1955. He had been with the Bell Telephone Company for over thirty-five years, most recently as general plant personnel supervisor in central Pennsylvania.

It Lets Man 'See' In Darkness

Continued from page 6

tion—between the x-ray generator and the fluoroscopic screen. On the picture tube of the intensifier, they could see the cancer. The beam of radiation was then narrowed down so that instead of irradiating the patient's whole chest, the x-rays struck only the area around the cancer. Finally it was narrowed to the point where it was on the diseased area and nothing else. This would have been impossible with the conventional fluoroscope, because were the doctor to view the image directly, he would himself be in the path of the therapeutic x-ray and his own tissues would be damaged. Now he can view the whole process from a safe distance and know exactly what part of the patient is being exposed.



While Dr. Morgan and Mr. Sturm devised what was later to be called the Lumicon for medical use, both were aware that it was nothing less than a light intensifier and could be used for other purposes. It was John D. Strong, professor of astrophysics and meteorology at Johns Hopkins, who encouraged them to branch out into more general uses.

One moonless night in 1954, Dr. Morgan, Mr. Sturm, and Dr. Strong took the intensifier to a place fifteen miles northwest of Baltimore where there was no skyshine from the city and no artificial light in the vicinity. There was only the light from the stars.

About a hundred yards from where they placed the camera, or orthicon tube, was a small house. It could not be seen at all with the naked eye. When the intensifier was switched on and the camera pointed at the house, it showed with reasonable clarity on the picture tube. This was the first dramatic demonstration of the use of Lumicon for a non-medical purpose.

The image of the house on the picture tube was not perfectly clear for the simple reason that the Lumicon can intensify available light, but its possibilities begin to approach a limit when the available light is almost nil. As Dr. Morgan put it, "there were just not enough photons ['particles' of light] to produce a completely clear picture."

But the Lumicon had passed its test. It would seldom have to operate with such a minimal amount of light. In most situations there would be either a moon or light from a distant artificial source.

The second and perhaps even more dramatic demonstration of the Lumicon's possibilities came later that same summer at Flagstaff. On July 2, when Mars was closer to the earth than it had been for thirteen years, the Lowell Observatory's astronomers were ready with a Lumicon adaptation on their telescope. When Mars swung into range of the telescope it appeared on the Lumicon.

"The best view of the planet we ever had," says Dr. Wilson. "For several seconds, we could detect a great deal of

fine detail, including linear and lumped markings, suggesting the famous but controversial canal system."

At the time, Dr. Wilson says, there was not proper equipment for photographing the image that appeared on the picture tube. "But we were, right then and there, convinced of the great usefulness of the Lumicon in the study of our neighbor planets, revealing them as they had never before been recorded, either by eye or by photographic plate."

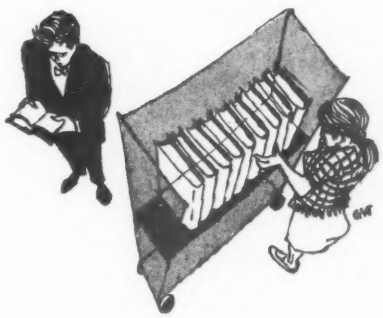
Eventually, if significant discoveries about Mars or other planets are made with the help of the Lumicon, it will be through the use of a camera that will photograph the picture-tube image and make a permanent record of what appears, freezing on film an image that the eye may see only fleetingly.

One of the problems of astronomy is that the telescope must peer through several hundred miles of the earth's turbulent, shifting atmosphere. The atmosphere at times acts like a lens but a moving one, so that the images of planets or stars shimmer and fade. The moments of clarity come only occasionally. The eye may have a clear view of a planet for an instant, but it is gone before its details can be comprehended and retained by the brain. This is why it has never been proved or disproved that the "canals" of Mars are not some sort of illusion. And no one has ever obtained a satisfactory photograph of them that can prove that the eye, which seems to see them occasionally, is not playing tricks.

The light that comes from a planet such as Mars is so faint that a photograph is impossible without long exposures, sometimes as long as a minute. During that time, the atmosphere causes Mars to "dance," so that the resulting picture is a blur. The brilliant image produced by the Lumicon, however, makes it possible to use an exposure of a tenth of a second or less. In this time the camera can catch the details that are lost in a long exposure. The Lumicon actually increases the light-gathering power of the telescope more than thirty times, so that the forty-inch telescope at Flagstaff becomes equal to about a 240-inch one. In the same way, the famous 200-inch Mount Palomar telescope would become equivalent to a 1200-inch one. Dr. Wilson believes that huge telescopes of the Palomar type will, with the Lumicon, no longer be necessary.

By a fortunate coincidence, the Lumicon's application to astronomy has been achieved in the nick of time. This summer, Mars will be at the point in the sky known as "favorable opposition"—closer to the earth than at any time in the past fifteen years. This time, astronomers will be ready, not only in Flagstaff but in Texas (at MacDonald Observatory) and in South Africa (at the sixty-inch telescope of the Lamont-Hussy Observatory near Bloemfontein), where better results are expected because Mars will be almost directly overhead and the telescope will be looking through less of the earth's troublesome atmosphere. Maybe, this time, the secret of the "canals" will be solved. If they do exist, and if they follow a geometrically logical pattern (such as great circle routes), discussions of the possibility that intelligent life is present on that planet may be expected to flare up anew.

At the public unveiling of the Lumicon by Bendix-Friez earlier this year, much emphasis was placed on potential industrial uses of the invention. Coupled with a fluoroscope, it could make instantaneous x-ray ex-



aminations of baggage moving on a conveyor belt, revealing hidden bombs like those that caused two commercial airline tragedies in the past decade.

Also in conjunction with x-ray, it could inspect metal castings for cracks. The castings would be rotated between the x-ray machine and the fluorescent screen, and the Lumicon would catch any beams passing through cracks. And, on its own, it might serve as a silent watchman to keep a nearly dark warehouse under surveillance from a single vantage point.

The principle of the Lumicon is that of any television circuit, plus an exceptional amount of intensification and amplification. The amplification principle is part of every radio and television set. But as amplification is increased, it brings with it a multitude of other problems. It is these undesirable side-effects, sometimes called electronic "noise," that Dr. Morgan and Mr. Sturm had to minimize.

To understand the whole circuit, it is best to follow the process from camera to picture tube. The TV camera, known as the image orthicon, looks upon a scene whose various parts reflect various amounts of light. As the ordinary camera has film that is sensitive to these gradations of light, the orthicon has a plate made of photo-electric or light-sensitive material which emits electrons according to the amount of light that strikes it. Behind the plate is a metal mesh with hundreds of holes per square inch, and behind the mesh is a glass "target" with which the electrons emitted by the plate collide. The parts of the plate that are receiving light from the bright areas in the scene send back a strong signal of electrons to the target. As they slam against it, they knock other electrons off, leaving a positively charged area on the target that corresponds to the brighter part of the picture. The dark areas of the picture, on the other hand, leave negatively charged areas on the target.

At the back of the tube is an "electron gun" which shoots a stream—or beam—of electrons toward the target. Such a stream can be pulled off its path if a magnet is placed nearby. By a series of regulated impulses on magnets located on four sides of the stream of electrons, the stream is made to move back and forth in narrow lines across the glass target, much as the eye moves when it reads, line by line, down a page of print. In the case of ordinary television the stream divides its target into 525 lines and scans all of them, thirty times a second. These are the lines that are later reproduced (and which can easily be seen) on the picture tube of a TV set. In the Lumicon, the stream of electrons makes 1,029 sweeps, every time it "reads" the target, thus providing a picture of superior clarity.

As it sweeps, the electron stream picks up and sends back not a continuous signal but a pulsating signal, from a picture that has been fragmented by the passage of electrons from the light-sensitive plate through the mesh and onto the target—much

like a newspaper or magazine halftone illustration (which is actually composed of dots). When the electron stream arrives at the target, it bounces back an electronic signal that is strong for the dark areas of the picture and weak for light areas.

Thus the orthicon changes the image of the scene before it into a series of electrical impulses moving in sequence. They are, however, very weak impulses—so weak they cannot be put to practical use. They must be amplified.

Amplification is a complicated process, but the most essential part of the job is done in a vacuum tube. The vacuum tube is a glass envelope with a wire called a cathode at one end and a metal plate at the other. A current is applied to the cathode, heating it so that electrons "boil" from it like steam from a kettle. The metal plate is positively charged so that the boiled-off electrons are attracted to it, like tacks to a magnet.

The electrons would flow freely from the cathode to the plate except for the fact that between them is placed a metal grid. The small signal coming from the orthicon is applied to the grid and makes it behave much like a traffic policeman directing a stream of automobiles. If the impulse into the grid is strong, it stops the traffic of electrons from cathode to metal plate; if the signal is weak, more electrons get through.

The result is that a small change in the signal sent to the grid results in a large change in the amount of current flowing from the cathode to the plate. The variation in the current is exactly in the same rhythm, pattern, or phase as the small signal. Hence the orthicon's signal is amplified, or made stronger. The process can be repeated in additional vacuum tubes until eventually the original signal, as in the case of the Lumicon, is amplified thousands of times.

When the amplified signal reaches the picture tube, it is again translated into a stream of electrons, this time directed at the face of the tube which is coated with a material that glows when electrons bombard it. Just as the stream in the orthicon had been sweeping over the target, changing the picture into electrical impulses, so the stream in the picture tube is sweeping over the fluorescent material at the same instant, changing the impulses back into the picture.

But in the case of the Lumicon, it is a picture that has been intensified—brightened—fifty thousandfold.

The Great Game Of Lacrosse

Continued from page 9

that they bought sticks and had them sent to Baltimore.

By mid-September members of the Baltimore Athletic Club, having spent the preceding weeks practicing on the front lawn of one of their number's Mount Washington estate, felt ready to try their hand at an intra-club practice game. A newspaper account relates that "the attempt to introduce the game was most successful. . . . It is most active and exciting and will certainly become a great favorite here." Two months later an intra-club exhibition match drew a crowd of more than four thousand spectators. The match was a gala affair. Governor John Carroll attended and Mayor Ferdinand Latrobe acted as an umpire. "The road skirting the field . . . was brilliant with landaus, park phaetons, dog carts, tandems, basket carriages, equestrians, and pedestrians." The metamorphosis from the Indian rite of *baggattaway* to lacrosse, the sport of gentlemen, was complete.

THE first inter-club game ever played in Baltimore occurred in May, 1879, when the Ravenswood Lacrosse Club of New York beat the Baltimore A.C. three to one. By spring of the following year two more clubs, the Monumentals and the Ivanhoes, had been formed in Baltimore.

Many of the members of these club teams, especially the Monumentals (who later became the famous Druids), were high-school students. When they went to college they were responsible for introducing lacrosse at Johns Hopkins, Yale, Harvard, Lehigh, Stevens Institute, and Princeton.

Although the game was first played at Johns Hopkins in 1885, it seems to have died out immediately thereafter. Not until 1888 did lacrosse receive a permanent place at the young school. The beginnings were modest enough: a five-to-one loss to the Druids and a six-to-two win over the Pattersons.

The next season, 1889, Hopkins had its first unbeaten team—unbeaten and untied in intercollegiate play, that is, by dint of a six-to-nothing victory over then-powerful Lehigh. Ties with two club teams rounded out the season.

The Intercollegiate Lacrosse Association was formed the following year by Hopkins, Princeton, Lehigh, and Stevens. The Hopkinsian, an early yearbook, reports that the team's three losses and no wins in league play were caused by "careful and long-continued abstinence from training and practice, which has become proverbial in Johns Hopkins athletics . . . We blush to own it, the team had what is vulgarly known as 'swell head.' " The Hopkinsian also attributed a measure of the team's uninspiring record to "an umpire who only had his Hopkins eye open for fouls."

WILLIAM C. SCHMEISSER, the all-time lacrosse wizard who for years was volunteer coach of Hopkins teams (they knew him as "Father Bill"), wrote of a practice game between the Catonsville Lacrosse Club and the Hopkins varsity during which the Hopkins center, S. S. Janney, sprained his knee. "This 'Janney knee' was a remarkable and valuable asset . . . It always managed to get sprained when the team was winded, but could be reduced to working condition again in a few minutes."

Johns Hopkins won its first intercollegiate championship in 1891. When the title returned to Hopkins in 1898, the Hullabaloo celebrated the joyous occasion with a verse:

> And that old banner of '91
> Which lonely in our gym has hung,
> At last has found its sequel, mate,
> In the championship banner of '98.

The championship banners of '99 and '00 soon had a home in the gym, also.

COLLEGIATE lacrosse has grown in popularity ever since the turn of the

century, while the number of club teams has constantly diminished. Nevertheless, the level of club team play has always been high, since the squads are usually full of older, experienced, ex-college stars. Club teams are strictly amateur and they frequently play scheduled games with college teams.

An all-star team composed mostly of club men traveled to England in 1884 for the first international lacrosse competition. The team compiled a record of nine wins, one loss, and one tie and so appealed to the English spectator that a crowd of forty thousand, including the royal family, attended one game. Two years later the Irish champions came to the United States for a tour. At irregular intervals since that first exchange, all-star and championship teams have been crossing the Atlantic to play international matches.

Of all the international competitions, the most spectacular must inevitably be the Olympics. Lacrosse was first played as part of the Olympic program at the 1928 Amsterdam games. The United States team was chosen by a play-off between the top six teams in the country (Johns Hopkins, Mount Washington Club, Maryland, Army, Navy, and Rutgers). Going into the playoffs Mount Washington was the decided favorite. The club team was full of ex-All Americans like Doug and Jack Turnbull and Kid Norris. Their first-round game was with Hopkins—a very decided underdog. Mount Washington had a three-to-two lead at halftime, but the combined play-making of Tom Biddison (now Baltimore's City Solicitor) and Bill Logan (now director of admissions at Johns Hopkins) tied things up. After that Mount Washington might as well have gone home; they lost, six to four, in one of the most thrilling games on record. By trimming Army and then the University of Maryland, Hopkins' team earned a free boat ride to Holland.

The first lacrosse game in Olympic history was played before an audience that had, for the most part, no idea what the game was all about. The ruddy Dutchmen, though confused, were enthusiastic, although the Algemeen Handelsbald reported "the opinion which most prevailed among our uninitiated was that the players were just there to beat each other up with the sticks."

A wild, enthusiastic cry from a solitary throat, "Come on, you United States lacrosse team!" spurred the team to a six-to-three victory over the Canadians. The next day, the United States played Great Britain, and the excitement of the close game finally tore one Oxford student from his traditional English reserve to the extent of crying, "Move about a bit, Lord Algy; move about!" This game the English won seven to six. In the final game Canada whipped England nine to five. Each team had won one game and lost one and each team had scored twelve points, but because the United States team had limited its opponents to ten points while Canada had eleven scored against it and England fifteen, the Americans were considered the winners.

The 1932 Olympics in Los Angeles found Johns Hopkins again representing the United States in a best-of-three-game series with Canada. The first, won by the United States, was played before a crowd of eighty thousand spectators, most of whom had come to see the finish of a marathon race in the stadium. When the second game of the series was played, without any other inducement, twenty-five thousand people came to watch, and forty thousand saw the Hopkins team take the final game of the competition and their second world championship.

Lacrosse is an ideal spectator sport. There are no involved technical rules, and the penalties are easy to understand. There are practically no interruptions between plays and the ball is never out of sight, as in football. The sport combines the speed of basketball, the body contact of football, and the openness of soccer—with the added thrill of difficult stick usage. Few people who see the game are not won over to it.

The sport has not been as widely adopted as many others, partly because the long-time dominance of the Maryland region seems to have discouraged the formation of other teams. In the last fifty years the intercollegiate lacrosse championship has been held by a team outside of Maryland only sixteen times (Johns Hopkins alone has been lacrosse champion twenty-six times in sixty-eight years of competition).

Lacrosse requires a great amount of skill and practice, and ideally training should begin at the high-school level. But there are only about forty secondary schools playing the game today (mostly in Maryland, New York, and New England), while more than sixty colleges have teams. The result is that about seventy-five per cent of the men playing on collegiate teams have never held a lacrosse stick before going to college.

The United States Lacrosse Coaches Association is active in spreading the game on the secondary school level, however. There are not enough experienced men available to teach first-class lacrosse on a high-school level, so the USLCA makes instructional movies and clinics available to help in training. And since 1940 a lacrosse clinic and a north-south all-star game have been held in the winter months to bring together players from all over the United States for practice and instruction.

Another problem which missionaries have had to face is the high cost of outfitting a team. Each man must have a stick, helmet, gloves, arm pads, and shoes, basic necessities that run to at least sixty-five dollars. Outfitting a ten-man team with uniforms and equipment costs nearly a thousand dollars, and as things now stand in the realms of athletic finance, most schools are willing to spend that much only on football. The coaches' association, again acting to spread the sport, recently established an equipment pool which acts as a reservoir, taking used equipment from schools now playing the game and lending it to schools that become interested in the sport, so that they may get under way without too much initial expense.

More colleges play the game now than ever before, and interest is especially high in the Midwest and New England. Even women's lacrosse, which has always been popular in England, is spreading from its traditional stronghold in Philadelphia to the rest of the country. Hunkers, as lacrosse fans have inelegantly been called, should have plenty of opportunity to yell "feed him the wood" this season and for many seasons to come; the native American game continues to make a successful bid for revival.

Universities And Public Service

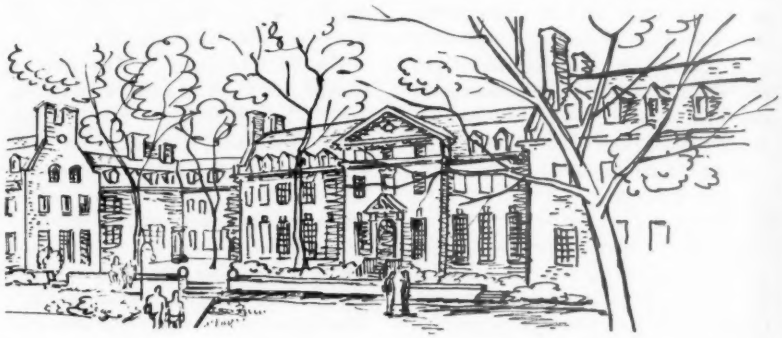
Continued from page 11

cial responsibility to prepare men for public service. Himself an exemplar of this doctrine, he never tired of admonishing his students and his colleagues of their obligations in this respect. Indeed, one may properly conclude that it was his experience at Johns Hopkins which formed and crystallized his conviction. In him, the Gilman principle found living justification. Now, when we commemorate the centennial year of Wilson's birth, we must remember also the forces which molded his thought, and we must be grateful to the men who charted the course which he followed.

WILSON'S view of what the university should do in preparing men for public careers would give little comfort to those who conceive of such training in narrow or technical terms. He believed that men could be properly schooled for such a career only if their specialized instruction came after they had gained, through the liberal arts, a proper foundation on which to build professionally. He asserted bluntly that "the worst possible enemy to society is the man who, with a strong faculty for reasoning and for action, is cut loose in his standards of judgment from the past." And he added that "the universities which train men to use their minds without carefully establishing the connection of their thought with that of the past, are instruments of social destruction."

This is not merely the plea of a man trained in history for the importance of his discipline. It is an expression of a profound conviction that the public cannot afford to trust to the judgment of men who are unschooled in history. And such schooling can best be obtained in colleges and universities. As he said, the college "should give the country men who know the probabilities of failure and success, who can separate the tendencies which are permanent from the tendencies which are of the moment merely, who can distinguish promises from threats, knowing the life men have lived, the hopes they have tasted, and the principles they have proved."

As Wilson saw it, the other principal foundation-stone of proper training should be a thorough grounding in, and not a nodding acquaintance with, the great literature of the world. This he regarded as essential for all education and for all professions. As he told the men of Princeton, "you do not know the world until you know the men who have possessed it and tried its ways before ever you were given your brief run upon it. . . . It is such a schooling that we get from the world's literature." He added a sentence that he may have looked back upon with wry satisfaction in later life: "It has always seemed to me," he said, "an odd thing, and a thing against nature, that the literary man, the man whose citizenship and freedom are of the world of thought, should ever have been deemed an unsafe man in affairs . . ."



It would not be fair to conclude from this brief comment that Wilson, the scholar, thought that all scholars were fitted for the practical direction of public affairs. Actually, he knew well the dangers and temptations of scholarship and he had no illusions about the ease with which men could succumb to them. As a younger man he had written the scathing comment that "scholars, therefore, do not reflect; they label, group kind with kind, set forth in schemes, expound with dispassionate method. Their minds are not stages, but museums; nothing is done there, but very curious and valuable collections are kept there."

His plea, therefore, was not for the scholar in politics, but for the educated man in politics. As the frontier was closing and national problems were growing yearly more complex, the day was passing when the man "of the simple or local type" could be trusted with the management of affairs. Our leaders of the future "must be wise with an adult, not with an adolescent, wisdom." And such wisdom was in part the product of carefully planned education. With such training, men might not always be wise, but the probabilities were much higher than among men who had been denied this opportunity. By carefully balancing emphases upon fundamentals and upon specialized instruction, the universities would produce appropriately trained men, and would thereby play their proper role in the America of the future.

ONE wonders if, as he wrote these views in the essays and speeches of busy academic years, Wilson ever paused to consider how his own life was being shaped to fit the pattern which he advocated. He was a scholar, but not a pedant. His prose gave ample evidence that when he advocated the study of literature and history, he knew from personal experience what such disciplines could do in furnishing an intellectual storehouse and in sharpening the cutting edge of a mind.

When at last he took off his cap and gown to enter politics he was no mere theoretician. Any university campus is filled with the stuff and essence of political conflict, and any university president, to be successful, must have no mean mastery of the art of politics. And Princeton in those days was more of a political cockpit than an elm-fringed enclave of quiet contemplation. When Wilson went to Trenton he had more than training; he had experience.

He had one other asset to complement both his training and his experience: a capacity for bold and imaginative leadership. He must have read President Gilman's inaugural warning that "universities easily fall into ruts. Almost every epoch requires a fresh start." He had struggled to apply this precept to Princeton and, if one may judge from the record, he was even more convinced that the time had come when it must be applied to Washington. He had the vision to realize that our society had

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undergone profound changes in the past decades and that it was the obligation of government to become a more active instrument, not only for protection against new abuses of the individual, but also for the positive furtherance of human welfare. His success in those early presidential years is striking evidence of what can happen when a mind trained in the rigorous processes of analysis is coupled with political skill and stubborn idealism.

Even when he was forced to devote his attention to the uncongenial problems of foreign affairs, his far-sightedness did not desert him. He came to see, as must all men worthy of leadership in the modern world, that the only alternative to wars of ever-increasing destructiveness lies in developing ties of permanent political association among the nations. Like many another man he lost his last great battle, though not the war, because his idealism had become a consuming imperative compulsion, and he forgot that politics is also the art of the possible.

As we commemorate the centennial of the birth of this extraordinary man, it may seem strange that I have chosen to lay so much stress upon Wilson's insistence that men in public affairs must be well trained, and preferably by our universities. If so, it is because the need which he so clearly foresaw has grown to dimensions which he could not have foreseen. Government has never been simple but it now has become almost bewilderingly complex. Society is no longer an aggregation of partially self-contained units; it is an intricate mechanism composed of myriad parts which must operate in harmony with each other. It is the task of government not only to ensure the smooth meshing of all the parts, but to determine much of the end product. Every state of the world is today essentially a Welfare State. The concept of the state as policeman and arbiter, and nothing more, now is rejected even in primitive societies.

Even greater is the burden of government in its international affairs. At the time when Wilson was born, most governments could, with impunity, remain largely indifferent to happenings in large parts of the world. They could concentrate their interest on neighboring states or on limited areas where economic or strategic influences might affect national welfare. Now, a hundred years later, where are the parts of the world with respect to which our people can remain unconcerned? Political trends in what once were regarded as primitive, remote, and exotic lands now are discussed over the breakfast tables of America. The province of our State Department now is no smaller than the round world itself. Our national concerns girdle the globe, penetrate the wastes of Antarctica, the while our scientists find political significance in rending asunder the component parts of the atom and in preparing the strategic conquest of outer space.

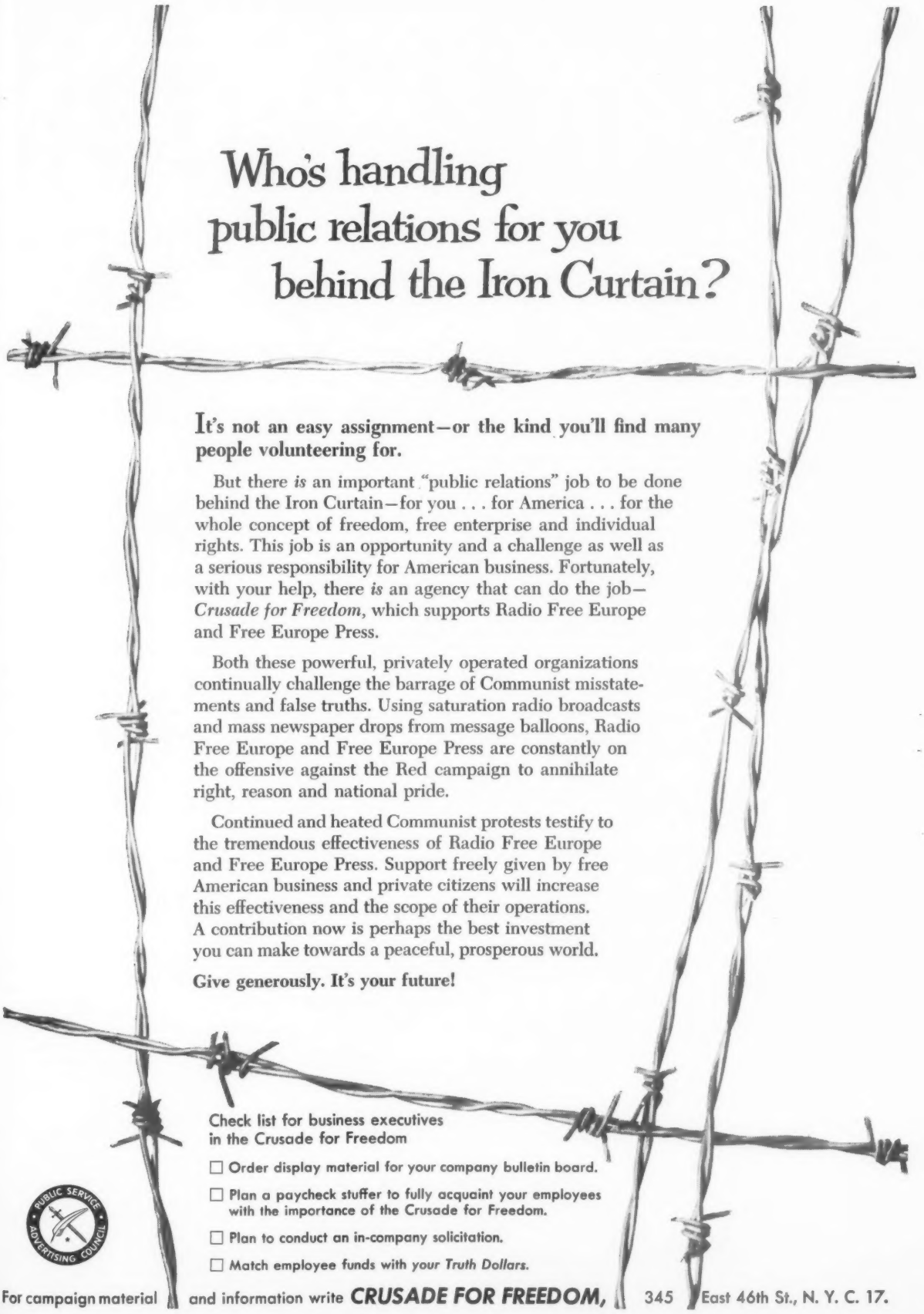
Nor is this all. When Wilson labored in this University to complete his doctorate, even when later he presided over the academic life of Princeton, the foreign problems of our nation were limited

to the protection of our citizens abroad, the encouragement and the regulation of our foreign trade, and like matters which had occupied the attention of foreign offices ever since the development of the modern state system. Approximately two hundred persons were employed by the Department of State when Wilson went to Washington in 1913. Today the number is in excess of ten thousand. This change has come about not only by the geographic expansion of our external interests, but also by the startling increase in the number and variety of activities which now make up that complex called Foreign Affairs. This does not represent the natural law of the growth of bureaucracy; it reflects the new dimensions of government.

As we reflect even momentarily upon the spectacular transformation in the role of government which has taken place in but a few busy decades, we realize that Wilson's warning about the need for trained governmental personnel is more meaningful to us than to his contemporaries. It has always been desirable to have leaders who were intellectually prepared for their task; today, it is imperative. Our representatives abroad and our policy makers at home can meet the probing of a cunning foe only if they are men of intellectual stature and mature culture. The road to Hell is not the only path which is paved with good intentions; so, too, may be the road to national disaster. I make no plea here for the snob or the pedant as a desirable representative abroad or at home; I ask only that we be not content that the alternative should be the amiable vulgarian who is prone to deal with foreign peoples as if they were still "lesser breeds without the law." Culture is not an ornament; because it connotes a well-stocked intellectual arsenal, it is a shield and buckler no less nationally important than industrial potential and technical skills.

The time is past when we can safely sit behind our ocean barriers and indulge ourselves in feelings of smug superiority about other peoples. Just as we have in effect experienced a profound change in the relationship of government to our people at home, so we are in the midst of a world revolution symbolized by the emancipation of the colonial peoples of the earth. We shall survive our difficulties at home and abroad, protecting our nation and preserving our liberties only if we entrust our destinies to men whose native intelligence has been sharpened by the discipline of training and enriched by the maturity of culture.

In the spirit of Wilson's warning about our needs in this realm, and conscious of the complexities of our mid-century life, we pay our word of tribute to a man who, though intensely human and by no means free from human frailties, was withal a man of commanding stature. As a young scholar, Wilson wrote these lines about a man whom he greatly admired: "Occasionally, a man is born into the world whose mission it evidently is to clarify the thought of his generation, and to vivify it; to give it speed where it is slow, balance where it is out of poise, saving humor where it is dry—and such a man was Walter Bagehot." May we add, "And such a man was Woodrow Wilson."



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